

Smoking women and their lung function tests

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Abstract

Smoking amongst women has become significant as the number of smoking women is increasing gradually in this developing society. It affects the lungs to produce Chronic Obstructive Pulmonary Disease (COPD). Present study was conducted over 100 smoker's women and 100 non-smoker women in the age group of 30-40 Years. Three Lung Function Tests – FEV1, FVC and PEFr were employed to all smoking and non-smoking women. It was observed that all the above mentioned three parameters of lung function tests were reduced significantly among smoker women as compared to non-smoker women. These reduced parameters of lung function test among heavy smokers are suggestive of chronic obstructive lung diseases.

Key Words: Smoking, FEV1, FVC, PEFr, COPD.

It is an established fact that inhalation of tobacco smoke either actively or passively is highly injurious to health. Consumption of tobacco has been very common among men. But women are now not lagging behind, rather, consumption in the form of *bidi* and cigarette has sharply increased in them since World War II. The proportion of women smokers is increasing faster than that of male smokers both in rural and urban areas of European as well as Asian countries (Colin R, Jesus T, & Sureo, 1971)¹.

Tobacco has remained as one of the most important predisposing factors responsible for so many respiratory and cardiovascular diseases. Chronic obstructive Pulmonary Diseases (COPD) has been recognized as one of the most important causes of morbidity and mortality in chronic tobacco smokers all over the world (Maclema et. al, 1972)⁴. COPD includes three conditions namely chronic bronchitis, emphysema and bronchial asthma which gradually cause chronic obstruction to the airflow in small airways less than 2 mm in diameter. These obstructions in airways invariably affect the parameters of pulmonary function e.g. Forced vital capacity (FVC), Forced Expiratory volume in the first second (FEV1) and peak Expiratory Flow Rate. Simonson (1962) showed that small changes in airway potency can be detected by FEV1 and hence this parameter is considered to be one of the best parameters for detecting narrowing of air passages causing obstructive types of lesions⁵. Airway obstruction in its early stages was found to be reversible when smoking was totally stopped (Ingram and O'cain 1971)².

Colin R. Woolf et. al. in 1971 also observed that women who smoked cigarette, showed significantly greater mortality rate as compared to those who never

smoked regularly and even more so between the ages of 35 years and 59 years¹.

As the number of smoking women is growing day by day, the study on smoking females is also becoming more important in respect to the changes in the airway leading to obstruction. With this view a survey was conducted in areas like Bharatpur, Tari, Narayangarh, Birgunj and Raxaul near Nepal to spot chronic smoking women. Lung function test like FEV1, FVC and PEFr of these women were done. These parameters detect COPD in early stages and may help one take appropriate measures to save the smoking women from injurious effects of tobacco on respiratory passages.

Materials and methods

The study was conducted with 100 females of 30 to 40 years age who heavily indulged in smoking tobacco mostly in the form of *bidi* up to 100 to 200 sticks per week for the last five to eight years. These women were apparently free from cardiovascular disorders such as COPD and other allergic pulmonary diseases. A 100 non-smoker healthy women belonging to same age height and weight group formed the "control" group.

Smoking and the control groups were selected from the age group ranging between 30 to 40 years because in this age group females are supposed to be in perfect health.

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Smoking women were exclusively selected, because their number has been increasing sharply in Nepal and moreover, they have remained unattended in respect to lung function test which can reveal impending changes in the respiratory passages.

The following lung function tests FEV1, FVC and PEFr were employed to the smoking women as well as to the control group (non-smokers) in sitting posture. These tests were done with the help of wright's peak flow meter and Toshniwal's expirograph and their results were analyzed.

COPD is not always associated with symptoms in smokers (asymptomatic smokers) but lung function tests if carried out are found to be severely altered. Heavy smokers who are asymptomatic might have severe obstructive pulmonary disease which can be revealed by FEV1, FC, and PEER tests. Such asymptomatic smokers might reveal serious decline of their pulmonary functions and they might turn into symptomatic category with the advancing age and increasing habits of smoking.

The whole procedure of the tests was explained in detail to the subjects and full demonstration was given on the machines to the smoking and non smoking women prior to application of these lung function tests.

Results:

The findings observed in the smoking and the control (non smoking) women were as follows:

1. The standing height of the subjects were 151 cms to 156 cms, and all ages combined, the mean height was 152 + 1 cm.
2. The body surface areas of the subjects were 1.53 to 1.51 metre 2 and all ages combined together the mean body surface area was 1.52 + 0.01 cm.
3. The mean values of smokers and non smokers were statistically insignificant in respect to age height and body surface area.
4. Comparative values of pulmonary function test were as follows (mean + SE).

Table explaining Comparative values of pulmonary function test

Test		FVC (ml)	FEV1 (ml)	PEFR (Litre / Min.)
Control Group	Range	2970 – 3620	2610 – 2770	330 – 340
	Mean value ± SE	3400 ±0.07	2727 ±0.02	332 ± 0.06
Smokers	Range	2420 - 2900	2010 – 2410	270 – 300
	Mean value ± SE	2700 ±0.045	2310 ± 0.03	280 ±0.09

The range of FVC in heavy smokers and the control group were 2420 to 2900 to 3620 ml respectively. The ranges of FEV, in heavy smokers and the control group were 2410 to 2010 ml and 2610 to 2770 ml respectively. The ranges of PEFr in heavy smokers and the control group were 270 – 300 litres / min and 330 – 340 litres/ min.

Discussion

Selection of smoking and the control women belonging to particular age group, weight and height was done to avoid any significant change occurring in the respiratory function test due to these factors. The mean value of FVC (Litres) reported by Colin, R. Wolf and Jesus T. Suero (1971)¹ was 3.07±0.04 in non-smokers and 2.91±0.04 in heavy smokers which is slightly higher than that of the subjects under the current study. The mean value of PEFr as shown is in

correspondence with the results reported by the above researchers. The results of the present study in the heavy smokers are similar to the results of other workers like Krumholz, RA and Hedrick EC (1973)³. The slight difference in our results could be due to the brand/quality of tobacco used by Nepalese women.

Conclusion

It is concluded that all the parameters of the lung function tests were reduced significantly among the heavy smokers when compared individually and statistically with those of the control group. These altered parameters on the lower side among heavy smokers are suggestive of chronic obstructive pulmonary diseases.

Keeping in view the deleterious effects of chronic and heavy smoking of tobacco in the form of *bidi* and cigarettes among women, an

anti smoking campaign should be launched by educating the population against the hazards of smoking.

Reference

1. Colin RW and Jesus TS. American Rev. of Resp. Dis. Vol. 103, 1971, 26.

2. Ingram RH Jr. and O'cain. C.F. Bull. Physiopatho. Respire (Nancy) 7: 195, 1971.
3. Krumholz RA and Hedrick EC. Am. Resp. Dis. 107, 225, 1973.
4. Maclema PT. American Journal of Medicine, 52:721, 1972.
5. Simonson EO. Am. Rev. Resp. Dis. 85: 534, 1962.